

CLAIMS

1. A process for treating a cereal material comprising:
extruding the cereal material to form an extrudate comprising starch and a
component selected from the group consisting of protein, fiber, and a mixture
5 thereof;
liquefying the starch in the extrudate; and
separating the extrudate into at least two or more streams comprising one or more
components selected from a group consisting of liquefied starch, oil, protein,
fiber, and mixtures therefore.
- 10 2. The process of claim 1 further comprising saccharifying said liquefied starch.
3. The process of claim 2 wherein the liquefied starch is saccharified prior to separation.
4. The process of claim 1 further comprising hydrolyzing protein.
5. The process of claim 1, wherein at least one of said streams comprises liquefied starch
and protein, and further comprising saccharifying said liquefied starch and hydrolyzing
15 said protein.
6. The process of claim 2 further comprising hydrolyzing protein of a protein containing
stream and combining at least a portion of the hydrolyzed protein and at least a portion of
the saccharified starch.
7. The process of claim 2 wherein the saccharified starch has a DE of at least about 20.
- 20 8. The process of claim 3 wherein the saccharified starch has a DE of at least about 20.
9. The process of claim 4 wherein the protein is hydrolyzed with a protease.
10. The process of claim 6 wherein the hydrolyzed protein has a total nitrogen to FAN
ratio not greater than about 5.
11. The process of claim 1 wherein the extruding of the cereal material comprises passing
25 the cereal material through an extruder that operates at a speed of at least 700 RPM with
an energy input to the extruder of about 100-250 W-hr/kg; wherein the extruder has a
length to diameter ratio of no more than about 12, and wherein the cereal material is
retained in the extruder for no more than about 10 seconds.

12. The process of claim 1 wherein the cereal material is extruded in the presence of an acid.
13. The process of claim 12 wherein the acid is selected from the group consisting of sulfuric acid, sulfurous acid, hydrochloric acid, a carboxylic acid, and a mixture thereof.
- 5 14. The process of claim 13 wherein the carboxylic acid is selected from the group consisting of acetic acid, oxalic acid, malonic acid, succinic acid, malic acid, lactic acid, citric acid, gluconic acid, and a mixture thereof.
15. The process of claim 1 wherein the cereal material is extruded in the presence of an amylase.
- 10 16. The process of claim 1 wherein the cereal material is extruded at a temperature from about 120 to about 280°C.
17. The process of claim 1 wherein the cereal material is contacted with a fluid selected from a group consisting of water, steam, or an aqueous solution.
18. The process of claim 1 wherein the cereal material is contacted with sulfur dioxide
15 and or salts of sulfite.
19. The process of claim 17 wherein the cereal material is contacted with an aqueous solution having a pH of less than 7.
20. The process of claim 1 further comprising contacting a component selected from the group consisting of fiber, oil, protein, starch, and mixtures thereof with a solvent selected
20 from the group consisting of hexane, isohexane, ethanol, methanol, acetone, propanol, iso-propanol, butanol and mixtures thereof, and separating the stream to provide an oil containing stream and an oil-depleted stream.
21. A fermentation feedstock product produced in accordance with the process of claim 1 having a carbon to nitrogen ratio not greater than about 15.
- 25 22. A fermentation feedstock product produced in accordance with the process of claim 4 having a carbon to nitrogen ratio not greater than about 15.

23. A fermentation feedstock product produced in accordance with the process of claim 5 having a carbon to nitrogen ratio not greater than about 15.
24. A process for producing a fermentation feedstock comprising using the product of claim 1.
- 5 25. A process for producing a fermentation feedstock comprising using the product of claim 8.
26. A process for using the product of claim 24 as a fermentation feedstock.
27. A process for using the product of claim 25 as a fermentation feedstock.
28. A fermentation feedstock produced according to claim 24.
- 10 29. A fermentation feedstock produced according to claim 25.
30. The process according to claim 20 further comprising recovering an oil product from the oil containing stream.